

• COLORADO RIVER •
AQUEDUCT NEWS

THE METROPOLITAN WATER DISTRICT

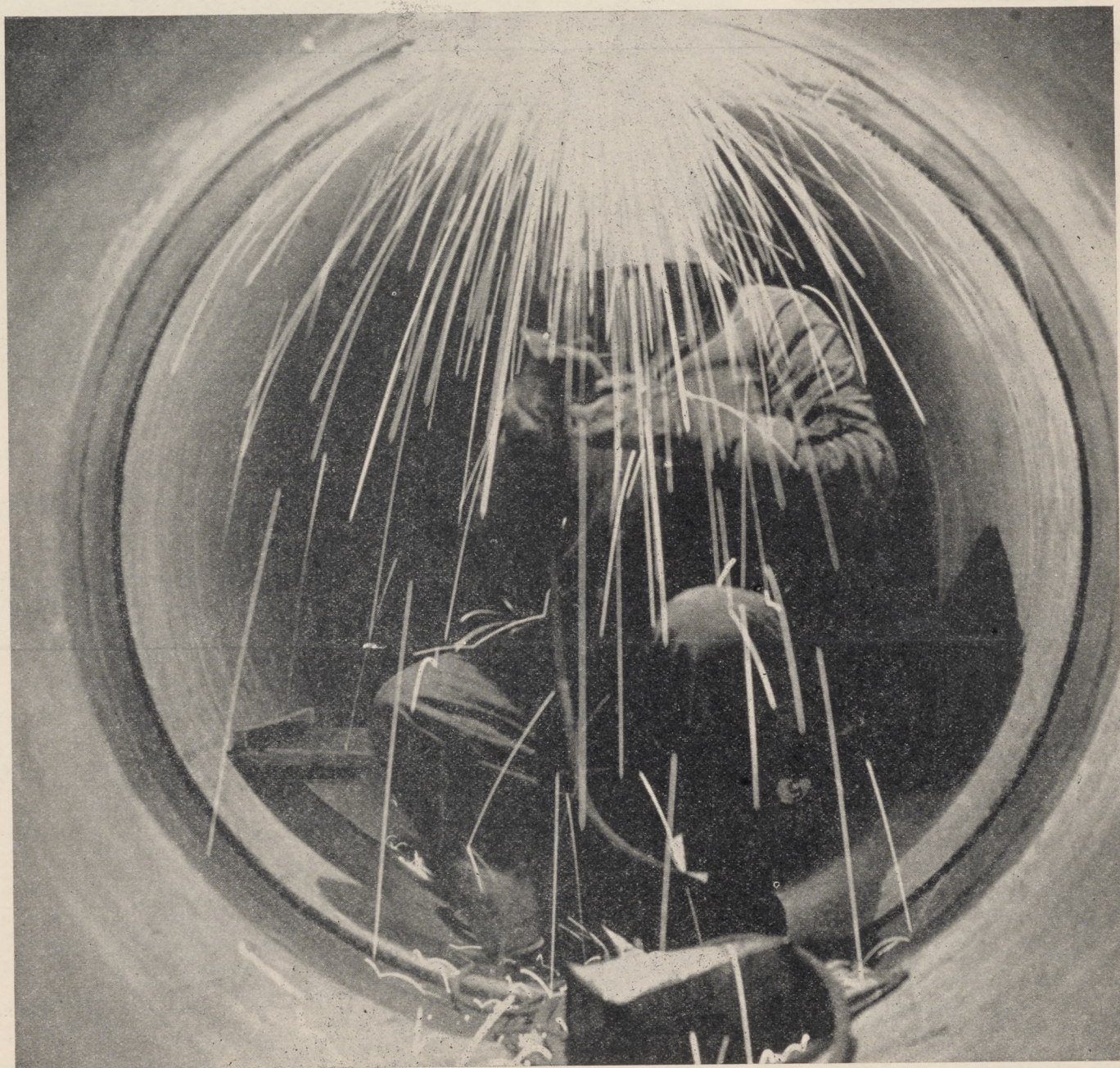


OF SOUTHERN CALIFORNIA

Vol. V

MAY 10, 1938

No. 9



District Photographer Will Fox took this interesting welding picture on the inside of the pipe line on Distribution Schedule 23SC.

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AQUEDUCT NEWS
 THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

306 WEST THIRD ST.
 LOS ANGELES, CALIFORNIA

Published twice monthly in the interest of Field and Office Workers on the Colorado River Aqueduct, and for the information of all other citizens of the Metropolitan Water District.

Vol. V May 10, 1938 No. 9

Complete Main Aqueduct Conduits On May 5

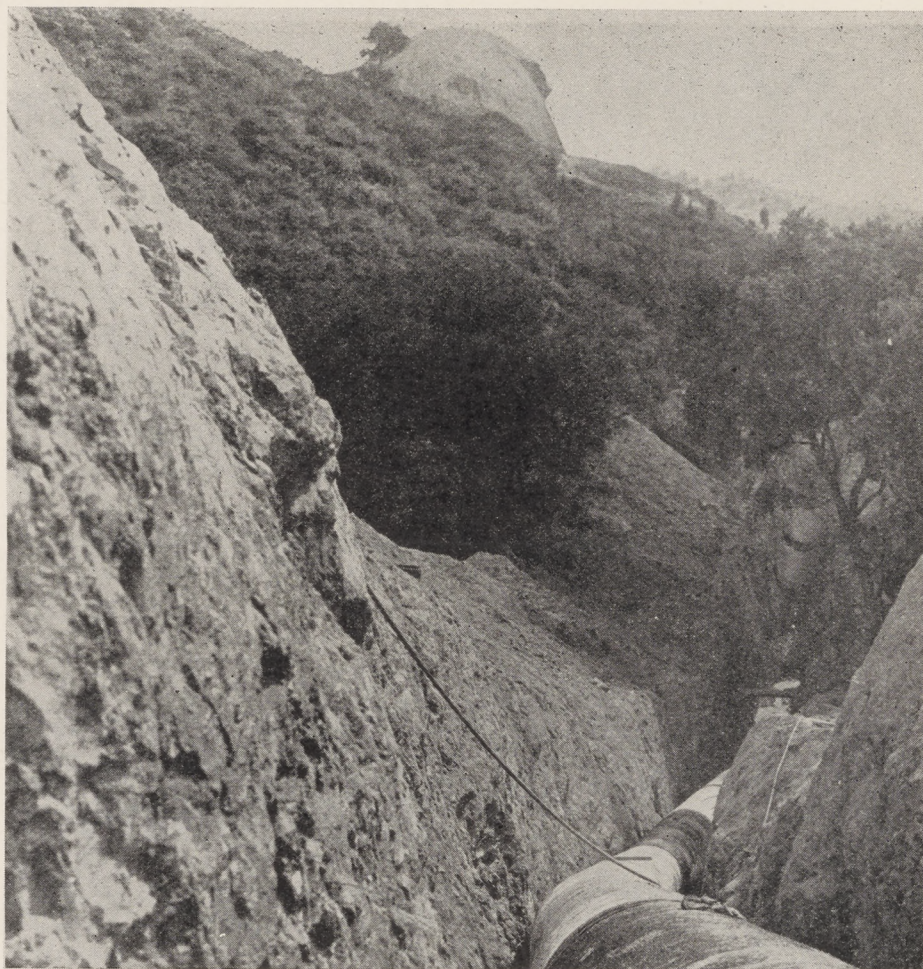
On Thursday, May 5, construction crews of the J. F. Shea Co., Inc., completed the placing of concrete in the aqueduct crossing of the highway and Southern Pacific Railroad east of Cabazon. There was less than 12 lineal feet of conduit arch placed in that last pour but it was a historic event, nevertheless, because it marked the completion of all conduits on the aqueduct and all contract open work from the Colorado River to the Cajalco Reservoir.

With the exception of the San Jacinto tunnel, and a short siphon to be constructed by the District at the West Portal of that tunnel, all tunnels, canals, conduits, and siphons on the main aqueduct are now completed. Of the 242 miles of various types of water carriers on the main aqueduct, 235 miles of these are ready for service. The remaining seven miles is in the San Jacinto tunnel, and only two miles of this remains to be excavated, the other five miles having been excavated but not yet lined.

That part of the job on which concrete placing was completed on May 5 is group schedule 19, which includes 34,870 feet of conduit and 2,235 feet of 11-ft.-5-in. circular monolithic siphon. This section of the aqueduct crosses the eastern end of the San Geronio Pass and connects the Whitewater No. 2 and the San Jacinto tunnels.

Construction quantities on this schedule included approximately 1,415,000 cubic yards of excavation, and 153,000 cubic yards of concrete. Located in Division 5, the work was built under the supervision of Division Engineer J. B. Bond and Senior Inspector E. W. Holland. H. F. Rennebohm (now on Distribution Sch. 21SC) has been the contractor's superintendent on the job which was started January 2, 1937.

(Continued on Page 8)



THE EAGLE ROCK

Taking its name from the well known landmark, this is the northern end of the Eagle Rock-Palos Verdes cross feeder on the distributing system.

— DIRECTORY —

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SUPERINTENDENTS OF CONSTRUCTION

PUMPING PLANTS
 Intake and Gene.....T. T. Walsh
 Iron Mt.....E. H. Martin
 Eagle Mt. and Hayfield.....R. C. Booth

SUPERINTENDENTS (Main Aqueduct Tunnels)

San Jacinto Tunnel, District Force Acct., B. C. Leadbetter, Gen. Supt.; S. J. Shrode, John Austin and C. E. Sides, Tunnel Supts.; Chas. F. Thomas, Jr., Edwin Noon, Supts.; F. A. Backman, Gen. Foreman.

(Distribution Tunnels)

Monrovia Tunnels Nos. 1, 2 and 3, West Construction Co., H. E. Carleton, Gen. Supt.; E. M. Penn, Concrete Supt.
 Monrovia Tunnel No. 4, L. E. Dixon Co., Bent Bros., Inc., and Johnson, Inc., W. N. Evans, Supt.

(Canal, Siphon, Conduit)

Schedules Nos. 14, 15 and 16,

Thompson - Starrett Co., Inc., Rodney Smith, Gen. Supt.; V. H. Wiese, Engineer.

Schedules Nos. 18, 19 and 20, J. F. Shea Co., Inc., Gilbert J. Shea, Gen. Mgr.; H. F. Rennebohm, Supt.

(Distribution Pipe Line)

Schedules 6P and 7P, J. F. Shea Co., Inc., Gilbert J. Shea, Gen. Mgr.; Ed H. Shea, Gen. Supt.

Schedules 9P, 10P, 11P, United Concrete Pipe Corp., John Huber, Plant Supt.; Roy Richards, Construction Supt.

Schedules 8C, 9C, 12C, Basich Bros.; Dick Noble, Supt.

Schedules 21SC, 22SC, 23SC, J. F. Shea Co., Gilbert J. Shea, Supt.

(Dams)

Cajalco dam, The Griffith Co., Franz Fohl, Gen. Supt.

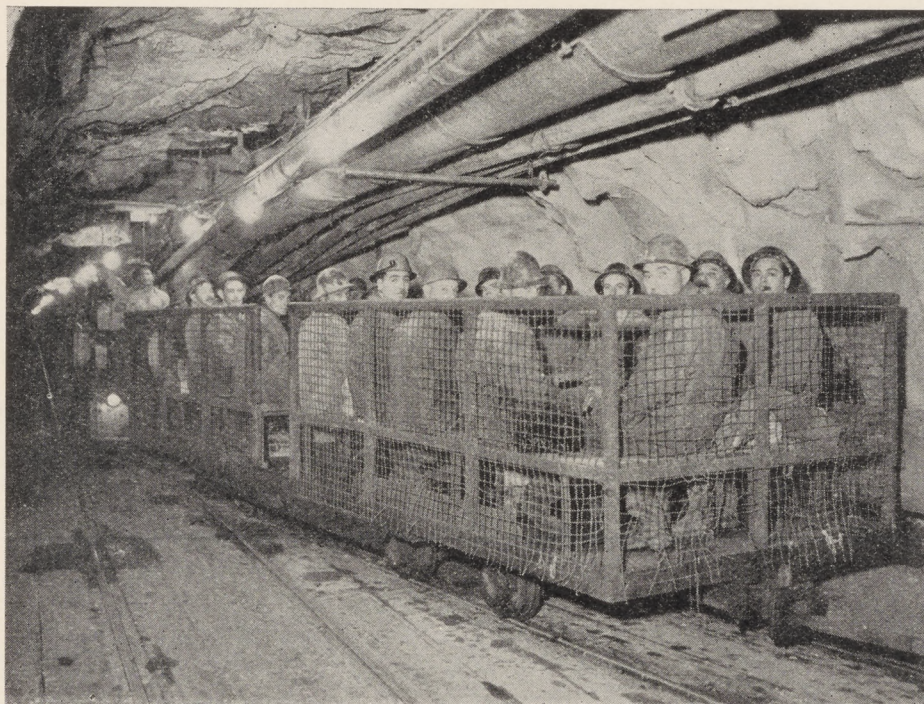
Parker Dam, J. F. Shea Co., Frank Crowe, Gen. Supt., H. P. Bunker, Constr. Eng., U.S.B.R.

Gene Wash dam, Copper Basin dam, J. F. Shea Co., Frank Crowe, Gen. Supt.

(Pumping Plants)

Intake and Gene Winston Bros. and Crowell, R. A. Crowell, Supt.; F. T. Hillman, Engr.

Eagle Mountain, L. E. Dixon Co., J. H. Larkin, Supt.
 Hayfield, Dixon and Case, Crawford Strehacker, Supt.



This is a part of the Cabazon crew that established a mark of 44 feet of excavation in that heading on April 30.

San Jacinto Excavation Reaches Eleven Mile Mark

Driving through 2,069 feet of granite during the month of April, hard-rock crews in the San Jacinto tunnel completed the excavation of the eleventh mile of that tunnel on the last day of the month.

Going into high gear at all headings, the crews turned in a new record for total footage, when, on April 30, they excavated 102 feet of main headings. During this 24-hour period the Cabazon face was advanced 44 feet for a new "best day, single heading" record on the San Jacinto tunnel.

Operating at four working faces, the tunnel crews averaged a total of 69 feet per day during the month of April. This is the best progress that has been made in one month in the San Jacinto tunnel since January, 1936, and is the best progress that has ever been made on the job for four headings.

Getting down to cases, the progress report for the thirty-day period shows: Cabazon, 828 feet; Lawrence East, 544 feet; Lawrence West, 175 feet; and Potrero, 522 feet. This latter footage is the best that has been made in the Potrero east heading since October, 1936.

By May 6, the distance remaining to be penetrated had been cut down to nearly two miles. On that date, this total distance was 10,564 feet, of which 3,117

was between Cabazon and Lawrence, and 7,447 was between Lawrence and Potrero. At the same time approximately 50 per cent of the tunnel had been lined.

Three Pumping Plants Accepted

As reported in the last issue of the NEWS, the contract work on the Intake, Gene, and Eagle Mountain pumping plants has been completed. Intake and Gene, built by Winston Bros. Company and Wm. C. Crowell under contract No. 229, were accepted by the District on April 29. Eagle Mountain plant was accepted by the M.W.D. on April 16. This plant was constructed under contract No. 248 by the L. E. Dixon Company.

Other work recently accepted by the District includes the Hazel Road extending around a part of the Cajalco Reservoir. Accepted by the District on March 28, the road was built by the Griffith Co. Also at the aqueduct terminal reservoir site is the suspension bridge running from the reservoir bank to the outlet tower. Built by the Kyle Steel Construction Co., the bridge was accepted by the District on April 4.

COPPER BASIN DAM CONCRETE 99% PLACED

Progress reports for the month ending April 30 show that 17,863 cu. yds. of concrete, or more than 99 per cent of the required amount, have been placed in the Copper Basin Dam.



The "rolling" camp of the Pittsburgh Steel Company on Fence Schedule No. 2. The camp is located on the desert between the Iron Mountain and Coxcomb tunnels.

CONSTRUCTION PROGRESS

April 16 to 30, 1938

TUNNEL (MILES)	EXCAVATION		LINING		CANAL, CONDUIT AND SIPHON (MILES)		DISTRIBUTION PIPE LINE (MILES)	
	Completed	Remaining	Completed	Remaining	Completed	Remaining	Completed	Remaining
Aqueduct	90.03	2.08	85.44	6.67	Excavation	145.60	48.01	15.68
Distribution	16.20	0.	15.98	0.17	Concrete	144.41	47.94	15.75
Total	106.23	2.08	101.42	6.84	Back Fill	80.64	47.67	16.02

TUNNELS

AQUEDUCT

CONTRACTOR	TUNNEL	LENGTH IN FEET	EXCAVATION IN FEET					LINING IN FEET					
			NUMBER OF SHIFTS	AVERAGE PER SHIFT	THIS PERIOD	TOTAL TO DATE	REMAIN- ING	ARCH OR INVERT	NUMBER OF SHIFTS	AVERAGE PER SHIFT	THIS PERIOD	TOTAL TO DATE	REMAIN- ING
THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA	SAN JACINTO												
	Cabazon Shaft to East Portal	8,880			Completed	8,880	0	{ Arch	0	0	*(396)	(33,604)	(35,239)
								{ Invert	0	0	0	8,484	396
	Cabazon to Lawrence	26,809	45	8.8	397	22,294	3,403	{ Arch	0	0	0	8,484	396
	Lawrence to Cabazon		45	7.8	350	1,112		{ Invert	0	0	0	6,973	19,836
	Lawrence to Potrero		45	2.0	90	510					0	6,972	19,837
	Potrero to Lawrence	17,672	45	4.6	209	9,604	7,558	{ Arch	8	34.4	275	2,661	15,011
								{ Invert	9	97.8	880	4,799	12,873
								{ Arch	0	0	0	14,953	529
	Potrero Shaft to West Portal	15,482			Completed	15,482	0	{ Invert	0	0	0	15,482	0
TOTALS	Ft. Miles	68,843 (13.04)	180	5.8	1,046 (0.20)	57,882 (10.96)	10,961 (2.08)	Arch Invert	8 9	34.4 97.8	275 880	33,071 35,737	35,772 33,106

DISTRIBUTION

WEST CONSTRUCTION CO.	MONROVIA NO. 3			Completed							*(1,077)	(31,197)	(898)
	East from Adit	11,340				11,340	0	Full Sec.			0	12,743	
	West from Adit					5,913	0	Invert			0	19,352	0
	From West Portal	20,765				14,851	0	Arch	59	22.8	1,347	18,230	1,122
	TOTALS	Ft. Miles	32,105 (6.08)			32,105 (6.08)	0	Full Section	59	22.8	1,077 (0.20)	31,197 (5.90)	898 (0.17)

*Invert considered to equal 0.2 and arch 0.8 of completed section.

Canal, Conduit, Siphon and Pipe Lines

AQUEDUCT

SCHED. NO.	CONTRACTOR	FEATURES	Length In Feet	EXCAVATION—Feet			CONCRETE—Feet			BACKFILL—Feet		
				Period	To Date	Remain'g	Period	To Date	Remain'g	Period	To Date	Remain'g
16	THOMPSON-STARRETT CO.	Conduit and Siphons	19,346	0	19,346	0	0	19,346	0	294	19,346	0
19	J. F. SHEA CO., INC.	Conduit and Siphons	37,105	0	37,105	0	77	37,072	33	566	36,778	327
20 A & B	M. W. D.—FORCE ACCT.	Siphon	752	0	705	47	0	0	752	0	0	752
	TOTALS		57,203	0	57,156	47	77	56,418	785	860	56,124	1,079

DISTRIBUTION PIPE LINES

9-P	UNITED CONC. PIPE CORP.	Precast Concrete Pipe	8,697	0	8,388	309	0	8,388	309	0	8,388	309
8C-9C-12C	BASICH BROTHERS	Cast-in-Place Conc. Pipe	1,656	0	864	792	0	673	983	0	480	1,176
21SC	J. F. SHEA CO., Inc	Welded Steel Pipe	28,930	0	0	28,930	0	0	28,930	0	0	28,930
22SC			28,310	0	0	28,310	0	0	28,310	0	0	28,310
23SC			34,470	1,576	10,027	24,443	1,704	9,838	24,632	2,326	8,631	25,839
	TOTALS		102,063	1,576	19,279	82,784	1,704	18,899	83,164	2,326	17,499	84,564

Miscellaneous Construction

PARKER RESERVOIR—SIX COMPANIES, INC.

FEATURES	Est. Quan.	Period	To Date	Percent
Diversion Tunnels—Excav.	3,463 Ft.	0	3,463	100
Diversion Tunnels—Concrete	3,363 Ft.	0	3,363	100
Cofferdams—Excav.	227,582 C.Y.	0	227,582	100
Cofferdams—Fill	464,890 C.Y.	0	464,890	100
Outlet Works—Excav.	220,000 C.Y.	0	207,176	94
Outlet Works—Concrete	5,000 C.Y.	207	5,144	99
Dam—Excavation	1,508,200 C.Y.	0	1,524,436	100
Dam—Concrete	297,900 C.Y.	1,372	288,396	97
Power House—Excav.	58,000 C.Y.	0	56,782	100
Power House—Concrete	14,000 C.Y.	0	15,414	100

GENE WASH RESERVOIR—J. F. SHEA CO., INC.

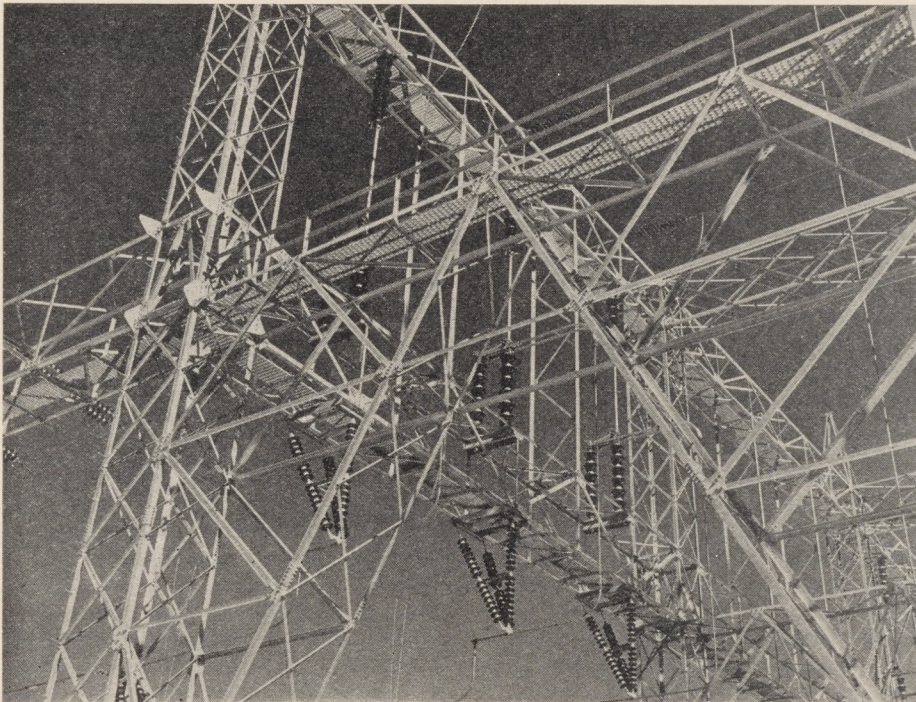
FEATURES	Est. Quan.	Period	To Date	Percent
Dam—Excavation	7,500 C.Y.	0	7,500	100
Dam—Concrete	14,339 C.Y.	0	14,267	99
Spillway—Excavation	4,762 C.Y.	0	4,762	100
Spillway—Concrete	4,729 C.Y.	0	4,729	100
Dike—Excavation	1,700 C.Y.	0	1,700	100
Dike—Fill	8,700 C.Y.	400	8,700	100
Dike—Concrete	1,200 C.Y.	0	450	38

AQUEDUCT PUMPING PLANTS AND APPURTENANT WORKS

PLANT	CONTRACTOR	PER CENT COMPLETED		
		Excavation	Concrete	Steel Erect'n
INTAKE	WINSTON BROS. CO. & WILLIAM C. CROWELL	100	100	100
GENE		100	100	100
IRON MT.	WOOD & BEVANDA	100	100	100
EAGLE MT.	L. E. DIXON CO.	100	100	100
HAYFIELD	L. E. DIXON & CASE CONST. CO.	100	91	88

COPPER BASIN RESERVOIR—J. F. SHEA CO., INC.

FEATURES	Est. Quan.	Period	To Date	Percent
Dam—Excavation	8,700 C.Y.	0	8,700	100
Dam—Concrete	18,000 C.Y.	1,336	17,863	99
Spillway—Excavation	8,000 C.Y.	0	8,000	100
Spillway—Concrete	2,045 C.Y.	893	2,015	95
Outlet Works—Excavation	Lump Sum	1%	46%	46
Gate House Superstructure				
Clearing Reservoir Site	427 Ac.	12	388	91



Resembling an intricate pattern of Irish lace, this interesting steelwork is the switch-rack at the Iron Mountain pumping plant.

Bids Opened for 80,000 More Barrels of Cement

Bids were opened on May 5 for furnishing 80,000 barrels, plus or minus 20 per cent, of portland cement to be supplied under the District's specifications No. 278. The cement is to be used in lining the San Jacinto tunnel. Bids were called for on alternative schedules providing for delivery at the mill, or at the Batching plant at the West Portal of the tunnel.

The estimate of principal construction quantities for the initial construction of the aqueduct system indicate that the job will include approximately five-million cubic yards of concrete. All cement for this concrete, whether used on contract or force account work, has been purchased by the District.

As of May 1, 1938, the total cement used on the job, purchased both on contracts and on purchase orders, totaled 6,767,883 barrels. One contract alone furnished 5,999,775 barrels. Including the cement on which bids were opened on May 5, it is estimated that an additional 400,000 barrels will be required, bringing the total used on the construction of the completed aqueduct to approximately 7,200,000 barrels.

Other materials recently purchased by the District include valves and lubricat-

ing oil, for which the Board of Directors made awards on April 29.

A contract was awarded to the Standard Oil Co. of California for furnishing from 12,000 to 20,000 gallons of oil to be used in lubricating thrust and guide bearings on the main pumps and motors in the aqueduct pumping plants. The oil company's bid was on the basis of 31 cents per gallon, oil to be furnished under Specifications E-383.

Work Started On Distribution Headworks

Construction of the headworks for the distributing system was started by The Contracting Engineers Company on April 23. Located at the north portal of the Cajalco outlet tunnel, this structure will be one of the important operating features of the aqueduct.

Being built to regulate and control the flow of water from the Cajalco Reservoir into the distributing system of the aqueduct, the headworks will be 541 feet in length. Connecting to the present Upper Feeder, the structure will also provide a connection for additional developments of the distribution system.

Contract work will be under the direction of J. Huddleston. The contract price for the work, which is to be completed by December 31, 1938, is \$158,980. District items are estimated at an additional \$118,270. Made up of three principal features, the headworks will consist of a valve structure at the portal of the Cajalco outlet tunnel, a forebay outlet structure, and a connection with the Upper Feeder running through a Venturi meter. The valve structure will include butterfly valves for shut-off purposes, and horizontal cylinder valves for regulating purposes.

Estimated quantities include 110,000 cubic yards of excavation, the largest part of which will be for the forebay.



It can't happen here, but it did. During the cold spell in the early part of January, 1937, this ice was formed in one of the Cajalco borrow pits as a result of sprinkling operations. The picture was sent in by Resident Engineer Dick Ward who took it on January 26, 1937.

Purpose of M. W. D.

Organization and Functions of the Metropolitan Water District

By Don J. Kinsey

Assistant to the General Manager, M.W.D.

With the withering hand of Drought laying its devastating grip, year after year, first upon one populous section of America and then another, there stand out today in Southern California thirteen favored cities forever protected against the scorching menace of Man's most deadly foe.

These are the thirteen cities of The Metropolitan Water District of Southern California. Through the establishment of the District and its work in building the Colorado River Aqueduct, these thirteen cities are providing themselves with an abundant, an assured, and a controlled water supply. A water supply that always will be available to their people whenever, wherever, and however it is needed.

Almost twenty years ago the people of Southern California first joined forces to bring about the control and conservation of the wild waters of the Colorado River. Here was an untamed water giant wasting its substance into the sea and periodically breaking out of its channel in a mad torrent of flood waters that devastated towns and wide areas of farm land. At the same time, the rapidly growing urban and agricultural centers on the Coastal Plain of Southern California were beginning to feel the need of additional supplies of water.

Civic and governmental leaders of Southern California submitted their problem to the National Government. They did not ask for gifts or free assistance. They asked the Government to lend its cooperation in a sound economic and engineering plan to control the floods of the Colorado River and conserve these waters for domestic and agricultural use, and for the generation of hydroelectric power. Thus, was born the Boulder Dam project.

First of all, the United States Bureau of Reclamation set under way a thorough study of the flood control and water conservation problems of the lower Colorado River. These studies were made by Arthur P. Davis, then the Director of the Reclamation Bureau, and by Frank E. Weymouth, then the Chief Engineer of the Bureau. The Reclamation Bureau completed its studies and made its recommendations in a report filed with the Department of the Interior in 1921. In brief, the Bureau recommended the construction of a high dam in Boulder Canyon of the Colo-

rado, and the building of the All-American Canal to provide for the dependable irrigation of Imperial and Coachella valleys.

A bill was drafted, based upon the findings and recommendations of the Reclamation Bureau. This bill was introduced in the Senate by Senator Hiram Johnson and in the House by Representative Phil D. Swing. Because the bill opened the way for the generation of large quantities of hydroelectric power at the site of the proposed Boulder Dam, it aroused the hostility of private power interests throughout the country. At the same time, Senators and Representatives from the Middle West, East and South were indifferent or inclined to be in opposition. State officers of Arizona, demanding a larger share of benefits for their state, were, for the most part, violently opposed to the bill.

The battle to overcome this tremendous obstacle of indifference and hostility was carried forward for six long years. In this long and arduous battle there stood out one man who deserves a major share in the credit for the final victory. That man was W. B. Mathews, then Chief Counsel for the Los Angeles Department of Water and Power, and later the General Counsel for the District.

In 1923, the first surveys and studies on the Colorado River Aqueduct were set under way by the City of Los Angeles. In 1925, the citizens of Los Angeles authorized a bond issue of \$2,000,000 to finance these engineering studies. Many other communities recognized a need for water fully as acute as that of Los Angeles, but as individual cities they could not hope to finance the Herculean task of building a waterway from the Colorado.

The problem was answered largely through the genius and efforts of Mr. Mathews and James H. Howard, the latter at that time being the City Attorney of Pasadena. These two men formulated and drew up the Metropolitan Water District Act. A bill containing the provisions of this Act was submitted at the 1925 session of the California Legislature. Various private interests were opposed to the adoption of the Act, and the bill was defeated by a narrow margin. Among those legislators who voted against the bill were several members from Southern California. At the 1926 elections, these men failed to be reelected. The bill was introduced at the 1927 session of the Legislature, and was adopted by a wide margin of votes.

The Metropolitan Water District Act is, in effect, the charter of The

Metropolitan Water District of Southern California. It sets up the powers and functions of the District. It provides a new type of municipal corporation wherein separate incorporated cities and water districts may organize a Water District for the purpose of financing, building and operating a water supply system.

Under the Act, the District is governed by a Board of Directors, each city having at least one representative, and no city, regardless of size, being permitted to exercise more than 50 per cent of the governing power. The directors serve without pay.

Following the adoption of the Act, the City of Pasadena initiated the organization of the District. Acting on motion of the City Board of Directors, the Pasadena City Clerk mailed to various Southern California cities an invitation to submit to their citizens the proposition of joining the Metropolitan Water District. Twelve cities submitted the proposition to their voters, and in eleven cities the people voted decisively to enter the District. In the city of Orange the proposition failed by a narrow margin.

The eleven original cities in the District were Anaheim, Beverly Hills, Burbank, Colton, Glendale, Pasadena, San Marino, Santa Ana, San Bernardino, Santa Monica and Los Angeles. Colton and San Bernardino residents had hoped that the aqueduct would come through the Coast Range by way of Cajon Pass in their immediate vicinity. These two cities withdrew from the District after the decision was made in favor of the route by way of the San Geronio Pass. Before the aqueduct bond election in September, 1931, however, Compton, Fullerton, Long Beach and Torrance had voted to join the District, and thus increased the number of District cities to thirteen.

Acting in accordance with the Act, District directors were appointed by the Mayors and confirmed by the City Councils of these eleven original member cities. The first meeting of the District Board of Directors was held on December 29, 1928, in the Huntington Hotel. Just eight days before this first meeting of the District directors, President Calvin Coolidge had signed the Boulder Dam bill. Thus, within the span of a few days, the people of Southern California had won their two major objectives—the assurance of Boulder Dam and the creation of a new governmental organization legally and economically equipped to bring about the building of the Colorado River Aqueduct.